

## PATENT SPECIFICATION



Application Date: Oct. 17, 1941. No. 13379/41.

552,722

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## PROVISIONAL SPECIFICATION

## Improvements in or relating to Fuel Containers for Aircraft

We, LEONARD SHAKESBY, a British Subject, of "The Willows", Uplands Avenue, Bradmore, Wolverhampton, England, and IMPERIAL CHEMICAL INDUSTRIES LIMITED, a British Company, of Imperial Chemical House, Millbank, London, S.W.1, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to improvements in or relating to flexible or semi-rigid liquid fuel containers for aircraft, and more particularly to connecting means for joining the interiors of a plurality of  
15 such containers in series, or outlet pipes therefor.

A potential source of fuel loss in such containers is leakage or seepage of the fuel at the points of conjunction or contact of the wall of the container and the connecting or outlet fuel pipes. It is an object of the present invention to provide an improved leak-proof connection between the container wall and the said  
25 pipes.

According to the present invention therefore a connecting or outlet pipe for flexible or semi-rigid fuel containers for aircraft comprises a metal tube provided  
30 with a coating of a substance resistant to the action of the liquid fuel which is inserted through and secured in leak-proof contact with the container wall by means of a metal tubular member flanged  
35 to permit attachment to the interior of the container wall and splayed and fitted with a suitable clamp or clip to ensure firm seating of the pipe therein.

The pipe may conveniently be formed  
40 of any suitable light metal or alloy thereof, with a coating comprising one or more layers of neoprene or other synthetic rubber-like substance or other material resistant to the action of the  
45 liquid fuel, which may be applied by any suitable means; such as, for example, in the form of a pre-moulded coating, by painting or dipping, or in the form of a fabric impregnated or coated with  
50 the material.

The clamp or clip may be of any suitable design which will ensure firm contact between the tube, the coating and the tubular member at all points on the periphery.

A preferred embodiment of the invention is illustrated by means of the accompanying drawings in which—

Figure 1 is a side plan view of two fuel containers connected in accordance with the invention.

Figure 2 is a sectional view showing the connecting tube and part of the two containers.

Figure 3 is a perspective view of the flanged metal tubular member.

Figure 4 is a cut-away sectional view of the connecting tube.

Referring to the drawings, two fuel containers 1 and 2 provided with one or more self-sealing and/or other coatings represented by 3 are connected at their lower adjacent ends by a pipe 4 comprising a light metal tube 5 with a coating layer 6 of neoprene coated fabric.

The tubular member comprises a metal tube 7 with longitudinal incisions 8 to provide a splaying effect and an annular outwardly extending flange 9 provided with perforations 10 to permit the member to be bolted to the interior container wall. For this purpose a correspondingly perforated annular ring 11 is provided on the exterior container wall and the assembly bolted together by bolts 12 passing through the container wall.

The pipe 4 is inserted through the tubular member 7 which is compressed into leak-proof contact with the pipe by means of the clamp 13 fitted with an adjusting nut 14.

It will be understood that although the invention has been specifically illustrated in relation to a connecting pipe between two containers, it is equally applicable to the construction of a leak-proof outlet pipe.

Dated the 17th day of October, 1941:

A. E. STROUD,

Solicitor for the Applicants.

## COMPLETE SPECIFICATION

## Improvements in or relating to Fuel Containers for Aircraft or other Vehicles

We, LEONARD SHAKESBY, a British Subject, of "The Willows", Uplands Avenue, Bramore, Wolverhampton, England, and IMPERIAL CHEMICAL INDUSTRIES LIMITED, a British Company, of Imperial Chemical House, Millbank, London, S.W.1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in or relating to flexible or semi-rigid liquid fuel containers for aircraft or other vehicles, and more particularly to connecting means for joining the interiors of a plurality of such containers in series, or outlet pipes therefor.

A potential source of fuel loss in such containers is leakage or seepage of the fuel at the points of conjunction or contact of the wall of the container and the connecting or outlet fuel pipes. It is an object of the present invention to provide an improved leak-proof connection between the container wall and the said pipes.

According to the present invention therefore a connecting outlet pipe for flexible or semi-rigid fuel containers for aircraft or other vehicles comprises a metal tube provided with a coating of a substance resistant to the action of the liquid fuel which is inserted through and secured in leak-proof manner to the container wall by means of a metal tubular member flanged to permit attachment to the interior of the container wall and splayed and fitted with a suitable clamp or clip to ensure firm seating of the pipe therein.

The pipe may conveniently be formed of any suitable light metal or alloy thereof, with a coating comprising one or more layers of neoprene or other synthetic rubber-like substance or other material resistant to the action of the liquid fuel, which may be applied by any suitable means, such as, for example, in the form of a pre-moulded coating, by painting or dipping, or in the form of a fabric impregnated or coated with the material.

The clamp or clip may be of any suitable design which will ensure firm contact between the tube, the coating and the tubular member at all points on the periphery.

A preferred embodiment of the invention is illustrated by means of the drawings accompanying the Provisional Specification in which

Figure 1 is a side plan view of two fuel containers connected in accordance with the invention.

Figure 2 is a sectional view showing the connecting tube and part of the two containers.

Figure 3 is a perspective view of the flanged metal tubular member.

Figure 4 is a cut-away sectional view of the connecting tube.

Referring to the drawings, two fuel containers 1 and 2 provided with one or more self-sealing and/or other coatings represented by 3 are connected at their lower adjacent ends by a pipe 4 comprising a light metal tube 5 with a coating layer 6 of neoprene coated fabric.

The tubular member comprises a metal tube 7 with longitudinal incisions 8 to provide a splaying effect and an annular outwardly extending flange 9 provided with perforations 10 to permit the member to be bolted to the interior container wall. For this purpose a correspondingly perforated annular ring 11 is provided on the exterior container wall and the assembly bolted together by bolts 12 passing through the container wall.

The pipe 4 is inserted through the tubular member 7 which is compressed into leak-proof contact with the pipe by means of the clamp 13 fitted with an adjusting nut 14.

It will be understood that although the invention has been specifically illustrated in relation to a connecting pipe between two containers, it is equally applicable to the construction of a leak-proof outlet pipe.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Means for connecting the interiors of or providing egress from flexible or semi-rigid fuel containers, comprising a metal tube provided with a coating of a substance resistant to the action of the liquid fuel which is inserted through and secured in leak-proof manner to the container wall by means of a metal tubular member flanged to permit attachment to the interior of the container wall and

splayed and fitted with a clamp or clip to ensure firm seating of the tube therein.

2. Means according to Claim 1 in which the tubular member has an annular 5 flange provided with perforations to permit the member to be bolted to the interior wall of the container.

3. Means according to Claim 2 in which a correspondingly perforated 10 annular ring is provided on the exterior of the container.

4. Means according to Claim 1 in which the metal tube is formed from a light metal or alloy thereof.

15 5. Means according to Claims 1 or 4, in which the coating on the metal tube com-

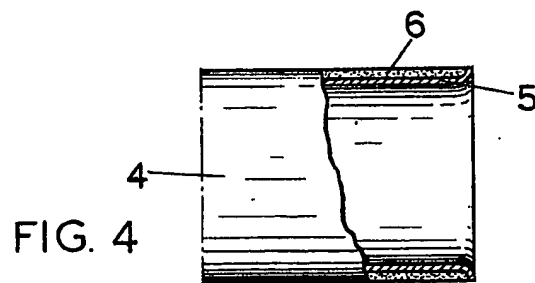
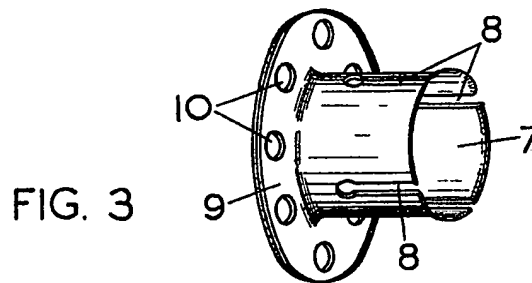
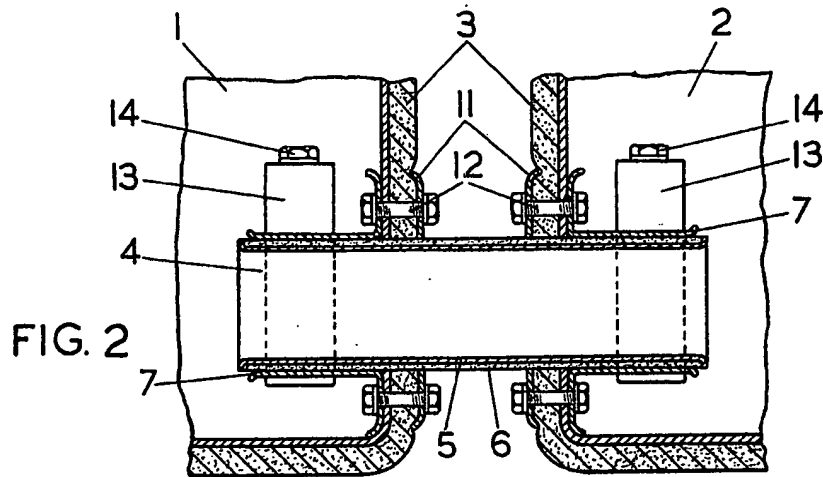
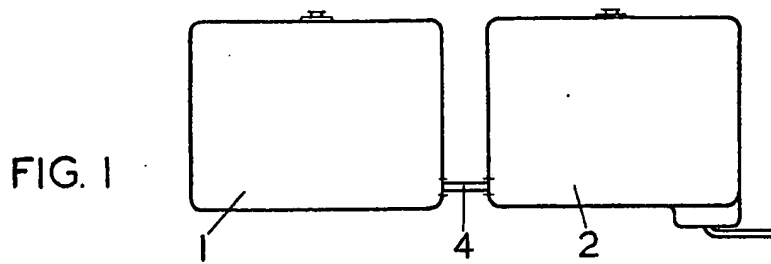
prises one or more layers of a synthetic rubber-like substance.

6. Means for connecting the interiors of or providing egress from flexible or 20 semi-rigid fuel containers, substantially as hereinbefore described with reference to the drawings accompanying the Provisional Specification.

7. Flexible or semi-rigid fuel con- 25 tainers whenever provided with connecting or outlet means in accordance with any of the preceding Claims.

Dated the 17th day of October, 1942.

A. E. STROUD,  
Solicitor for the Applicants.



[This Drawing is a reproduction of the Original on a reduced scale.]